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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/017,118	12/07/2001	Seong-Won Cho	5006-1-004	9055

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EXAMINER

HESELTIME, RYAN J

ART UNIT	PAPER NUMBER
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2623

DATE MAILED: 09/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/017,118

Applicant(s)

CHO, SEONG-WON

Examiner

Ryan J Hesseltine

Art Unit

2623

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 February 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Korea on March 6, 2001. It is noted, however, that applicant has not filed a certified copy of the 2001-11441 application as required by 35 U.S.C. 119(b).

Response to Amendment

2. The preliminary amendment filed February 12, 2002 has not been entered since page 2 of the amendment is apparently missing. The first page illustrates an amendment to the paragraph on page 13, line 13 of the specification, and the page marked page 3 is the version of the paragraph with markings to show changes made. Please clarify this matter.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 7 and 8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Claim 7 recites the limitation "the predetermined amount" in line 4. There is insufficient antecedent basis for this limitation in the claim.

6. Claim 8 recites, "The method of claim 7, wherein said step (c) comprises the steps of: ...determining whether there is a match in data compared in step (e)". It is unclear to the examiner how the step (c) refers to a subsequent step (e) and also how a new characteristic

Art Unit: 2623

vector can be accepted when the characteristic vectors are not generated until step (f) using a wavelet transform in parent claim 7.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 7 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Daugman (USPN 5,291,560, newly cited).

9. Regarding claim 7, Daugman discloses a method for correcting a rotated iris image, the method comprising the steps of: (a) capturing a plurality of iris images from a person's eye (column 4, line 53-56; column 6, line 50-53); (b) detecting an inner (pupillary) and outer (limbic) boundary of said iris images (column 7, line 57-column 8, line 14); (c) converting the predetermined amount of said captured iris images into polar coordinates (column 6, line 34-37; column 7, line 31-56); (d) determining whether one of said iris images is slanted (rotated); (e) if yes, temporarily generating a plurality of arrays (iris codes) of said-iris image (made with several different relative shifts along their angular axis) with respect to an array of said converted polar coordinates (column 12, line 54-63); (f) performing a wavelet transform to generate characteristic vectors (codes) corresponding to the plurality of said arrays that are temporarily generated (column 10, line 8-28); and, (g) comparing said respective characteristic vectors generated with previously registered characteristic vectors to obtain similarities in order to authenticate said person (column 12, line 64-column 13, line 20).

Art Unit: 2623

10. Regarding claim 9, Daugman discloses that the outer (limbic) boundary of said iris image is obtained by comparing the pixel value representing said detected eye image with coordinates with the other pixel values surrounding the inner boundary of said iris image to determine the maximum difference indicative of the outer boundary of said iris image (column 7, line 6-56).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Daugman in view of Hanna et al. (USPN 6,714,665, newly cited, hereafter Hanna).

13. Regarding claim 1, Daugman discloses a method for correcting a rotated iris image, the method comprising the steps of: illuminating at least a portion of iris and pupil of a person's eye (inherent) to detect an eye image (column 4, line 35-36, line 53-56; column 5, line 19-22); (a) extracting an iris image from said detected eye image (column 4, line 57-58; column 9, line 52-55); (b) detecting an inner (pupillary) and outer (limbic) boundary of said iris image (column 7, line 57-column 8, line 14); (c) converting said extracted iris image into polar coordinates (column 6, line 34-37; column 7, line 31-56); (d) if said iris image is slanted (rotated), shifting iris codes along their angular axis with several different relative shifts (column 12, line 54-63); (e) comparing previously obtained iris identification information with said iris codes obtained in step (d); and, (f) determining whether there is a match in data compared in step (e) to authenticate said person (column 12, line 64-column 13, line 20). Daugman does not disclose

Art Unit: 2623

normalizing the corresponding said polar coordinates of said converted iris image so as to yield a predetermined dimension.

14. Hanna discloses a fully automated iris recognition system utilizing wide and narrow fields of view including an iris preprocessor 324 that locates the boundaries of the iris and separates the portion of the image corresponding to the iris from the rest of the image, which image is then normalized to compensate for tilt introduced by pan and tilt mirror 16, and to compensate for the person having a gaze direction not directly into the lens of the imager (column 11, line 53-60). It would have been obvious to one of ordinary skill in the art at the time the invention was made to normalize the corresponding said polar coordinates of said converted iris image so as to yield a predetermined dimension as taught by Hanna in order to compensate for tilt introduced by pan and tilt mirror and to compensate for the person having a gaze direction which is not directly into the lens of the imager (column 11, line 56-60).

15. Regarding claim 2, Daugman discloses determining whether said iris image is rotated at an angle with respect to the centerline of said iris image; if yes, temporarily generating a plurality of arrays of said iris image with respect to an array of said converted polar coordinates (column 12, line 54-63); performing a wavelet transform to generate characteristic vectors corresponding to the plurality of said arrays that are temporarily generated (column 10, line 8-28); comparing said respective characteristic vectors generated with previously registered characteristic vectors to obtain similarities; and, accepting a new characteristic vector corresponding to the maximum similarity among said obtained similarities as the correct characteristic vector of said person (column 12, line 54-column 13, line 20).

Art Unit: 2623

16. Regarding claim 3, Daugman discloses that the outer (limbic) boundary of said iris image is obtained by comparing the pixel value representing said detected eye image with coordinates with the other pixel values surrounding the inner boundary of said iris image to determine the maximum difference indicative of the outer boundary of said iris image (column 7, line 6-56).

17. Regarding claim 4, Daugman discloses that a predetermined percentage (partial occlusion by upper eyelid and specular reflection areas excluded from analysis and encoding) of regions around said iris image are converted into polar coordinates for said comparing step (e) (column 8, line 39-column 9, line 2).

18. Regarding claim 5, Hanna discloses that an infrared (IR) light is used for illumination (column 13, line 25-29; column 14, line 38-46; column 21, line 63-67).

19. Regarding claim 6, neither Daugman nor Hanna discloses that a Canny edge detector is used for detecting the inner boundary of said iris image. The examiner takes Official Notice that Canny edge detectors are well known in the art of image processing. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a Canny edge detector in order to detect the inner boundary of said iris image.

20. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Daugman as applied to claim 7 above, and further in view of Hanna.

21. Regarding claim 8 (as interpreted by the examiner), Daugman (in view of Hanna) discloses that said step (c) comprises the steps of: normalizing the corresponding said polar coordinates of said converted iris images so as to yield a predetermined dimension (Hanna, column 11, line 53-60); comparing previously obtained iris identification information with said

Art Unit: 2623

normalized polar coordinates obtained in said step (c); determining whether there is a match in data compared in step (e); and, accepting a new characteristic vector corresponding to the maximum similarity among said obtained similarities as the correct characteristic vector of said person (column 12, line 64-column 13, line 20; see above discussion of claim 1).

22. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Daugman as applied to claim 7 above.

23. Regarding claim 10, Daugman does not disclose that a Canny edge detector is used for detecting the inner boundary of said iris image. The examiner takes Official Notice that Canny edge detectors are well known in the art of image processing. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a Canny edge detector in order to detect the inner boundary of said iris image.

Conclusion

24. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- USPN 5,566,246 to Rao discloses a system and method for ranking and extracting salient contours for target recognition including a Canny edge detector.
- USPN 5,572,596 to Wildes et al. discloses an automated, non-invasive iris recognition system and method including locating the inner and outer boundaries of an iris and normalized spatial correlation.

Art Unit: 2623

- USPN 6,144,754 to Okano et al. discloses a method and apparatus for identifying individuals including detecting the boundary between the pupil and the iris and the boundary between the iris and the sclera as well as polar coordinates.
- USPN 6,285,780 to Yamakita et al. discloses an apparatus for identifying individual animals and an image processing method including measuring the position, inclination and size of the iris and a normalization unit that performs coordinate transformation.
- USPN 6,373,968 to Okano et al. discloses a system for identifying individuals including polar coordinates set with respect to two circles circumscribing the pupil and the iris, and dividing the iris region into multiple subdivisions.
- USPN 6,526,160 to Ito discloses an iris information acquisition apparatus and iris identification apparatus including detecting inner and outer diameters of the iris, normalizing pixels, and polar coordinates.
- USPN 6,700,998 to Murata discloses an iris registration unit including cutting an iris image from an eye image by detecting the boundary between an external edge and an internal edge.
- "Biometric personal identification based on iris patterns" to Zhu et al. including texture analysis using multichannel Gabor filtering and wavelet transform that is translation, rotation, and scale invariant.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ryan J Hesseltine whose telephone number is 703-306-4069.

The examiner can normally be reached on Monday - Friday, 8:30 AM - 5 PM.

Art Unit: 2623

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on 703-308-6604. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ryan J. Hesseltine
September 15, 2004


JINGGE WU
PRIMARY EXAMINER